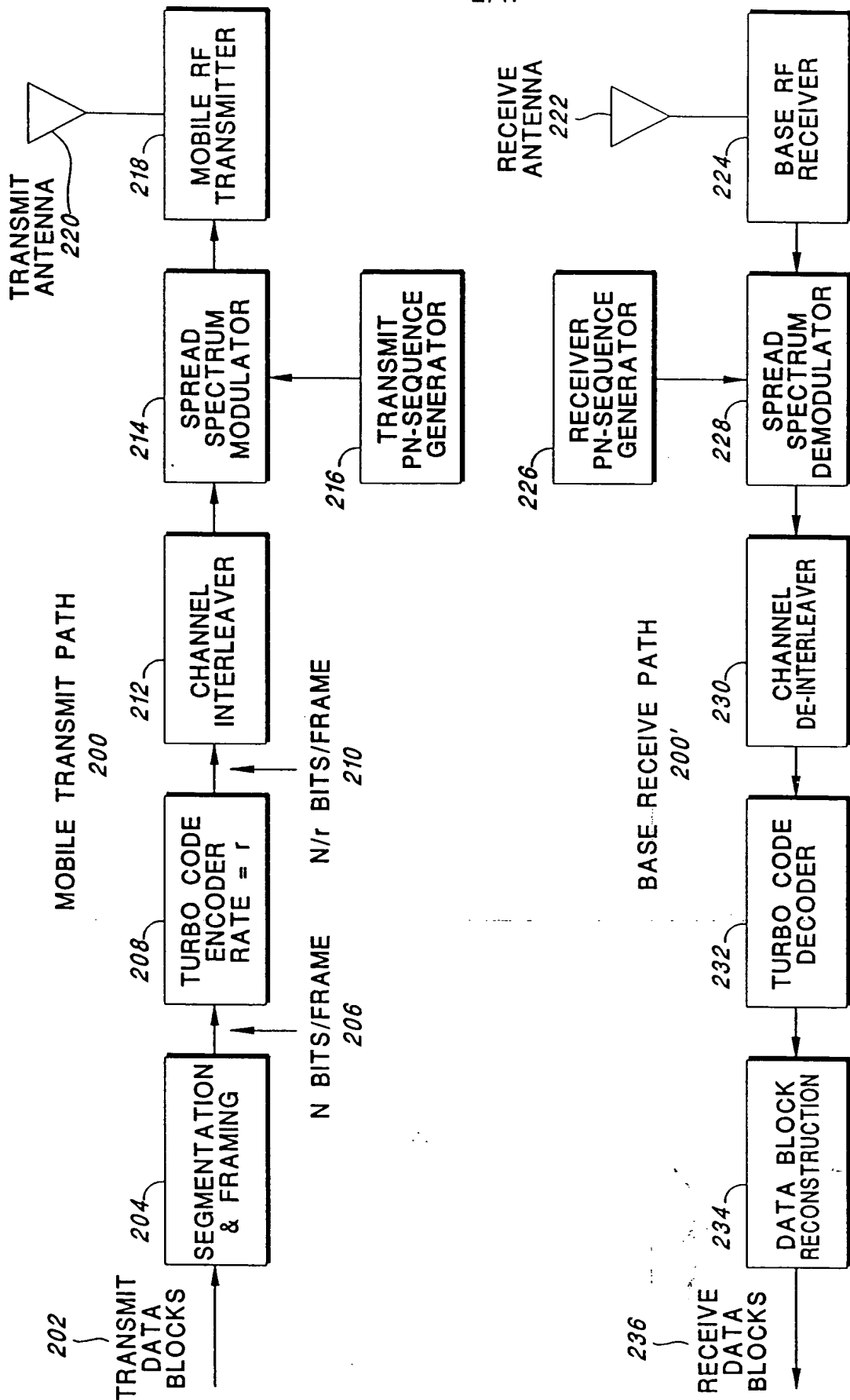


BLOCK DIAGRAM OF A DIRECT SEQUENCE CDMA DIGITAL CELLULAR MOBILE TRANSMITTER AND BASE RECEIVER

FIG. 1



EXAMPLE OF A CDMA COMMUNICATIONS LINK USING TURBO CODES

FIG. 2

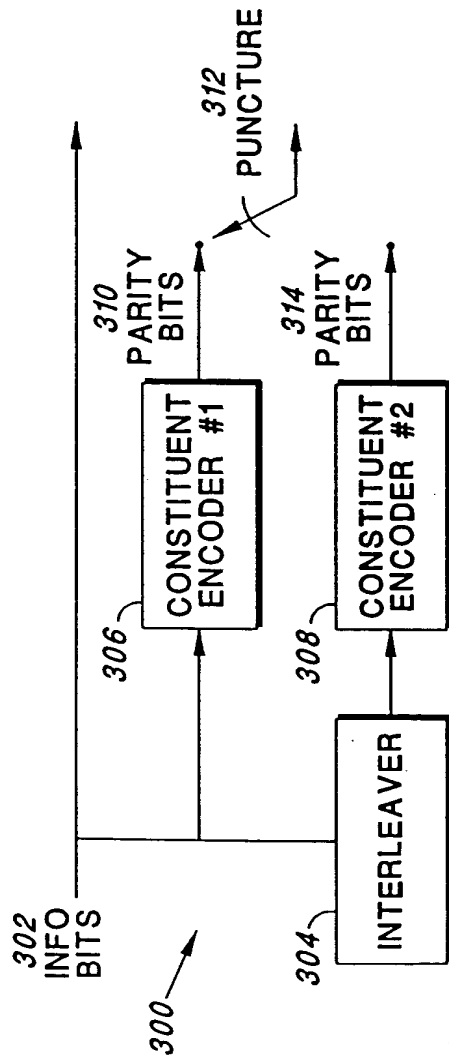


FIG. 3
GENERIC TURBO CODE ENCODER BLOCK DIAGRAM

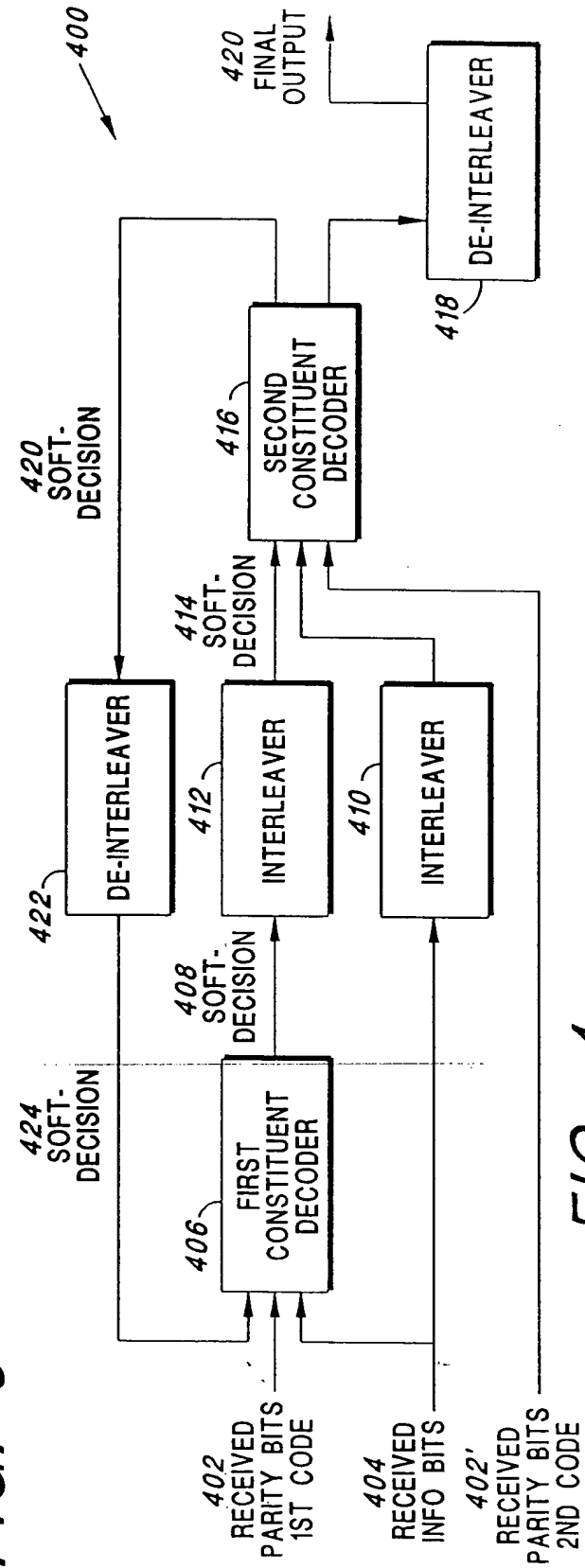


FIG. 4

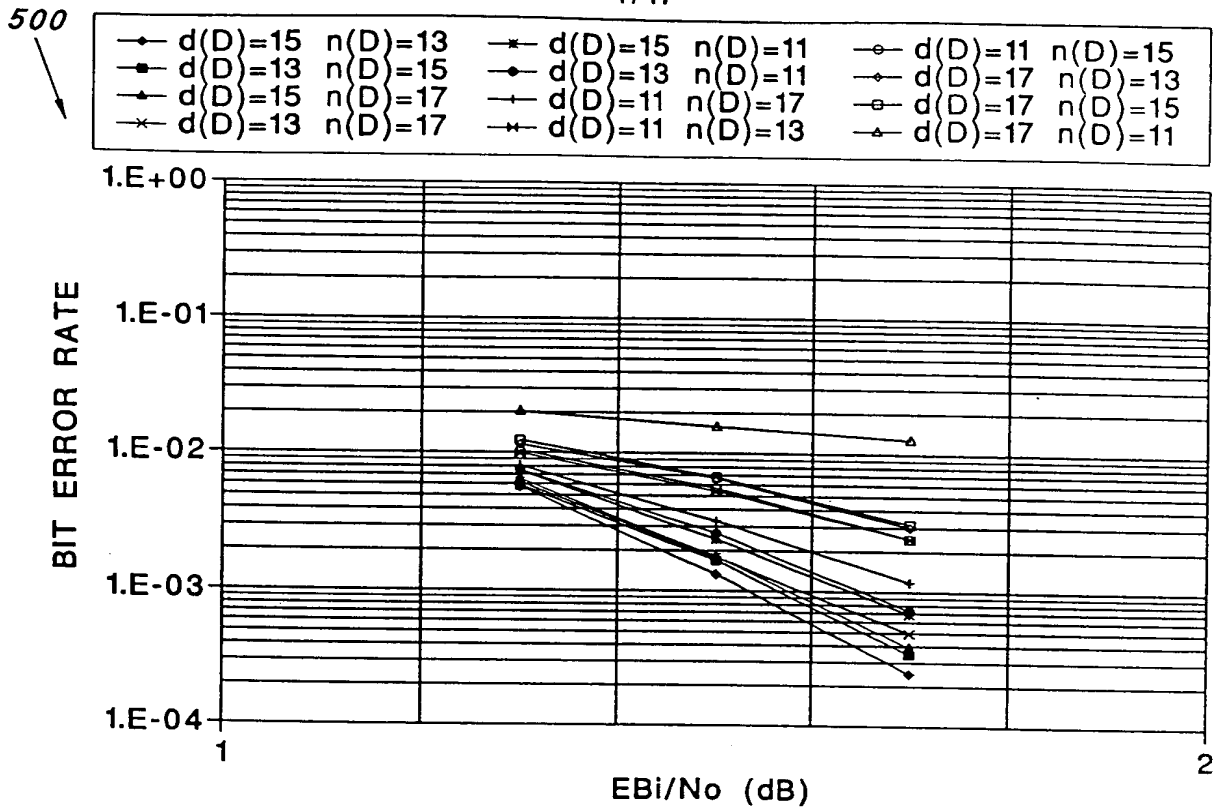


FIG. 5 RATE-1/2 TURBO CODES ON AWGN CHANNEL.
(1000 BIT INTERLEAVER, 3 ITERATIONS)

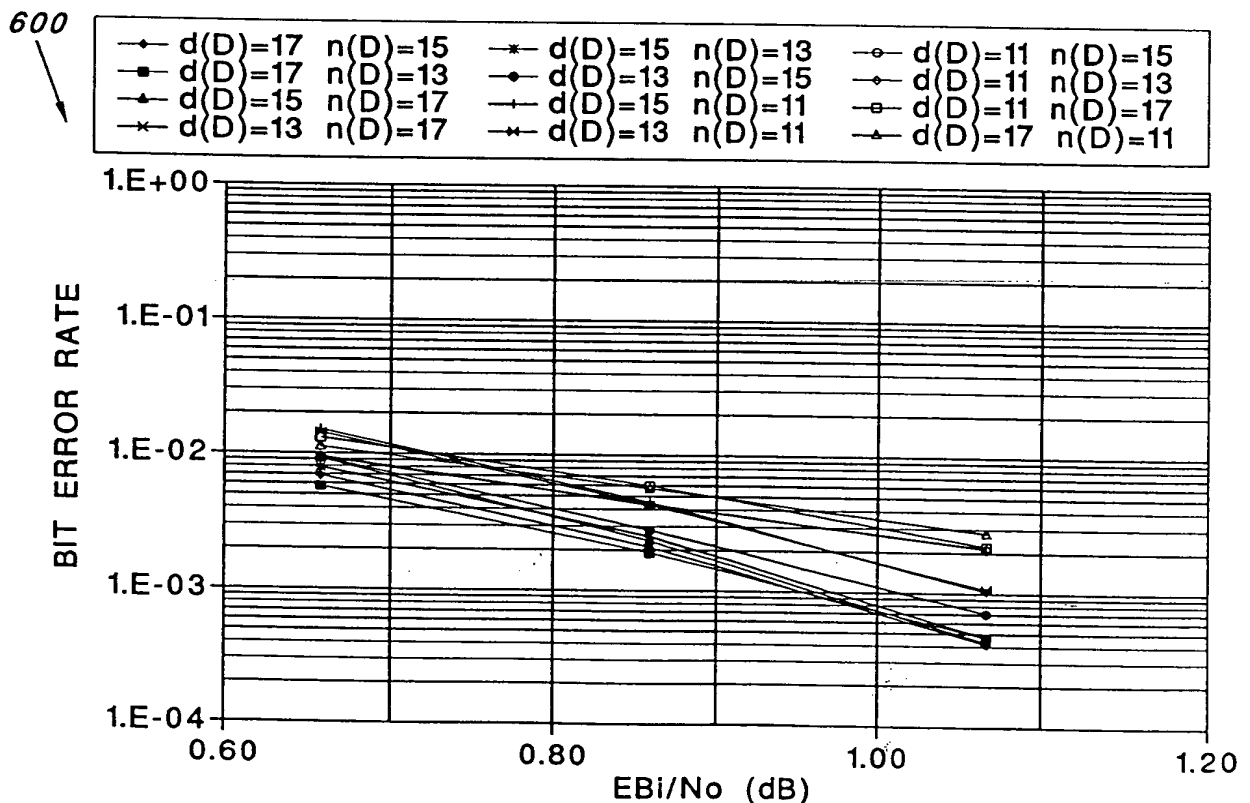


FIG. 6 RATE-1/3 TURBO CODES ON AWGN CHANNEL.
(1000 BIT INTERLEAVER, 3 ITERATIONS)

700

5/17

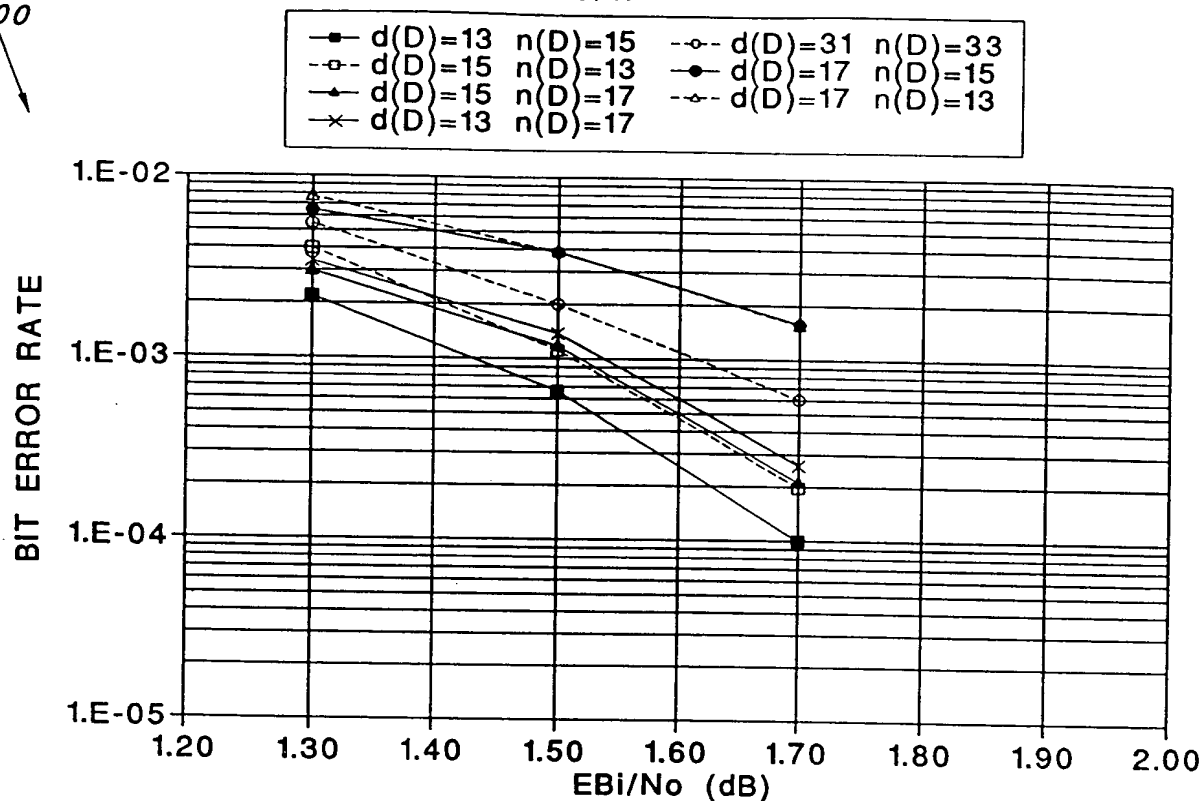


FIG. 7 SELECTED RATE 1/2 TURBO CODES ON AWGN CHANNEL, 512 BIT FRAME SIZE

800

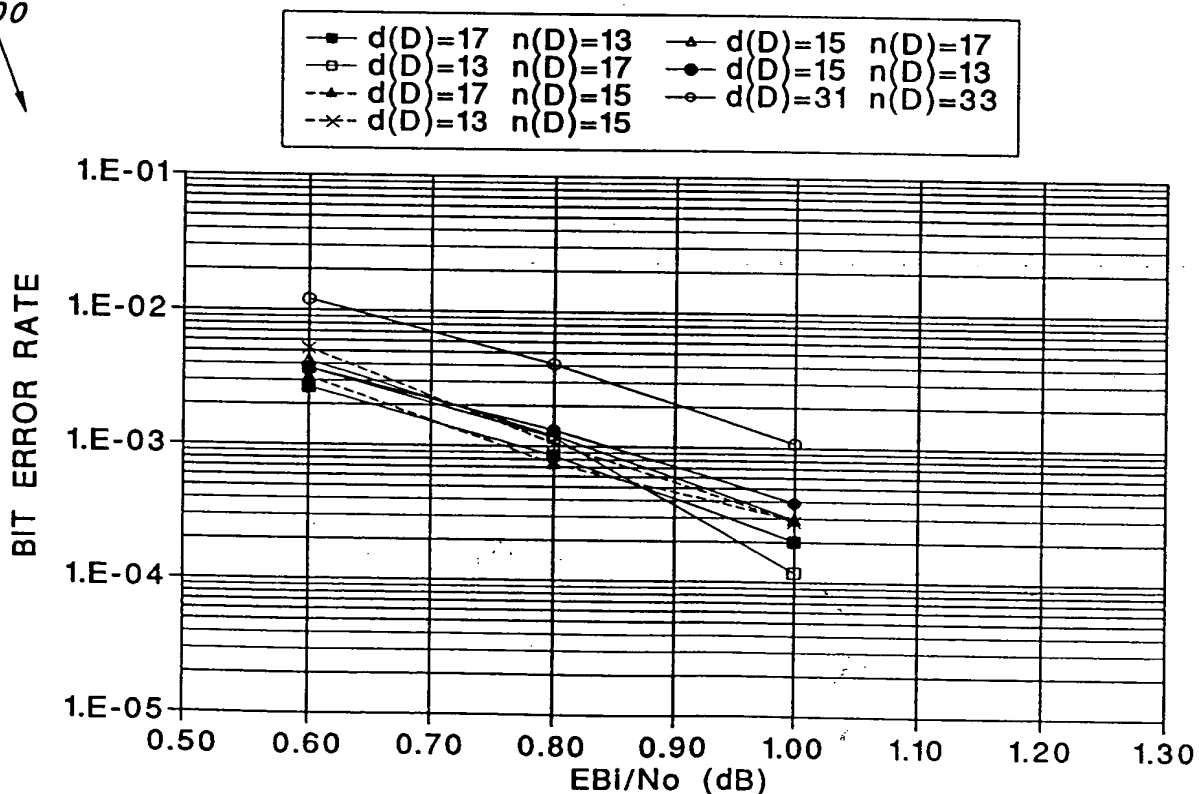


FIG. 8 SELECTED RATE 1/3 TURBO CODES ON AWGN CHANNEL, 512 BIT FRAME SIZE

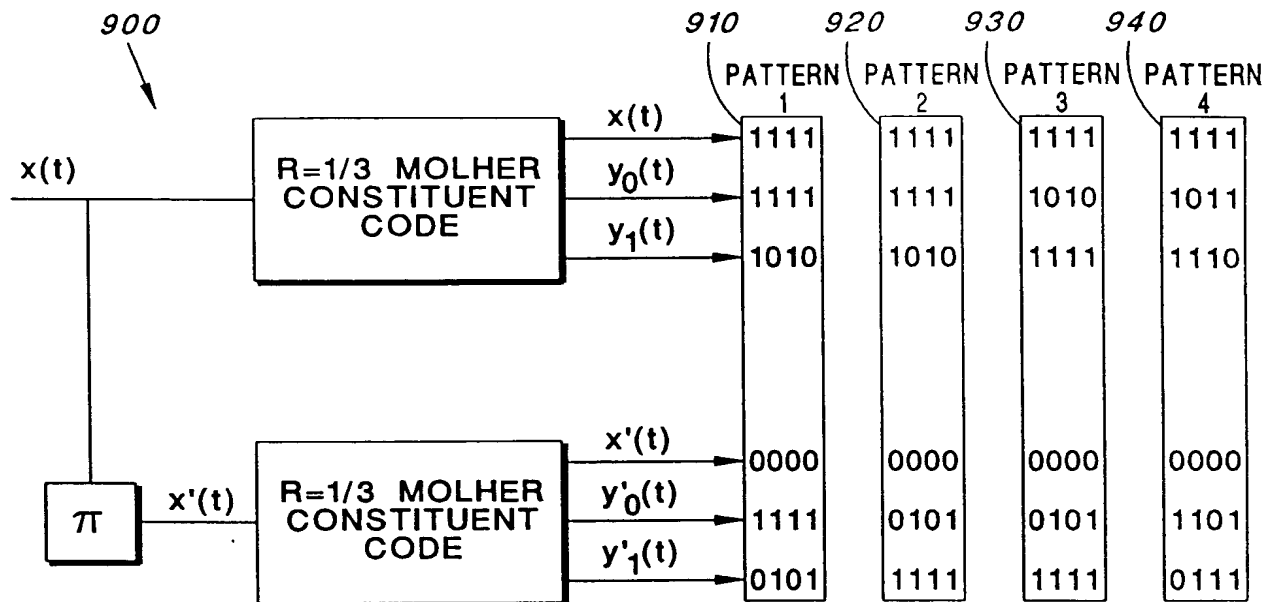


FIG. 9 PUNCTURING SCHEMES STUDIED FOR OPTIMIZING THE RATE 1/4 TURBO CODE

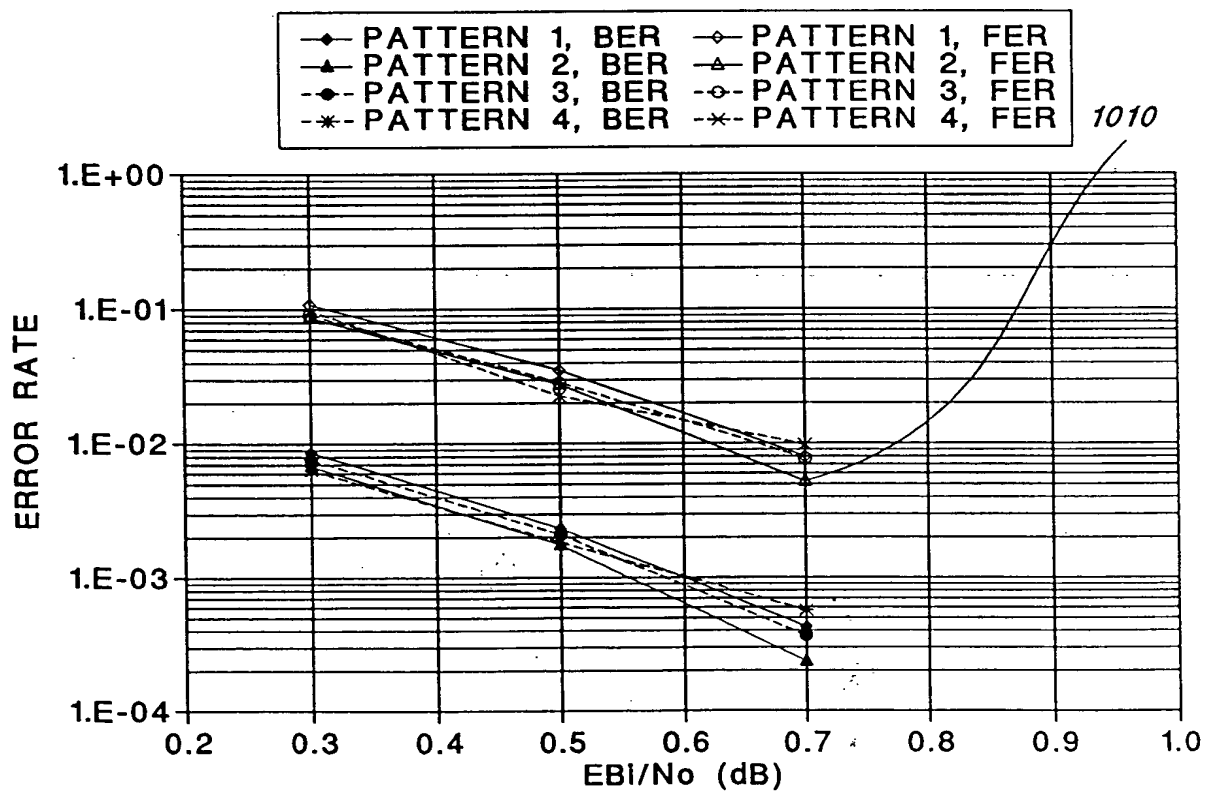


FIG. 10 PERFORMANCE OF CODE #1, FRAME SIZE=512

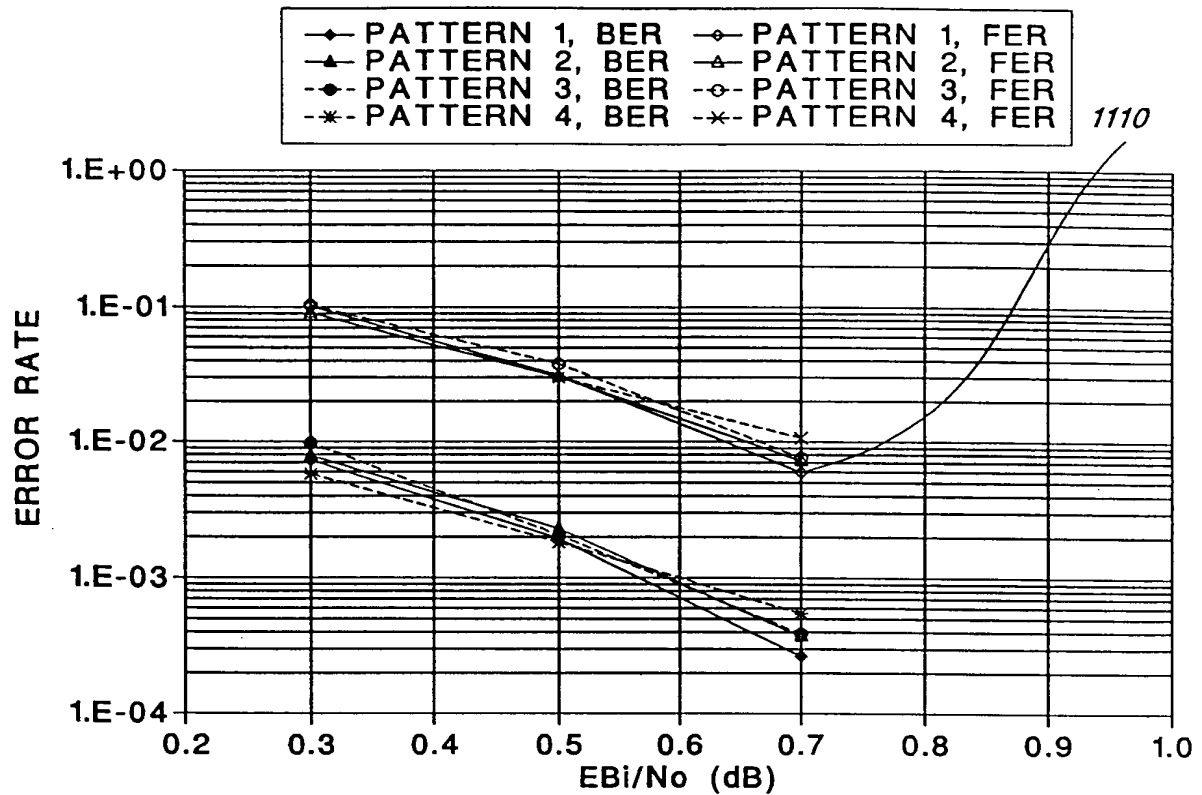


FIG. 11 PERFORMANCE OF CODE #2, FRAME SIZE=512

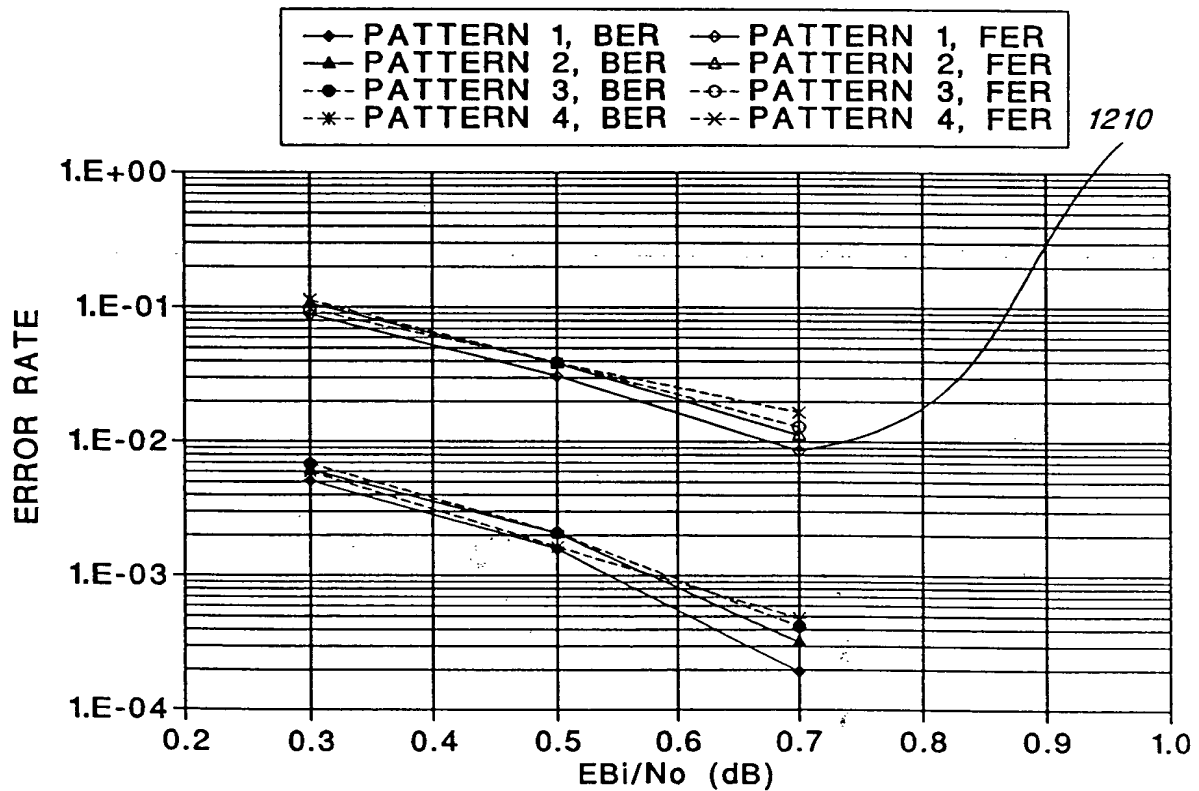


FIG. 12 PERFORMANCE OF CODE #3, FRAME SIZE=512

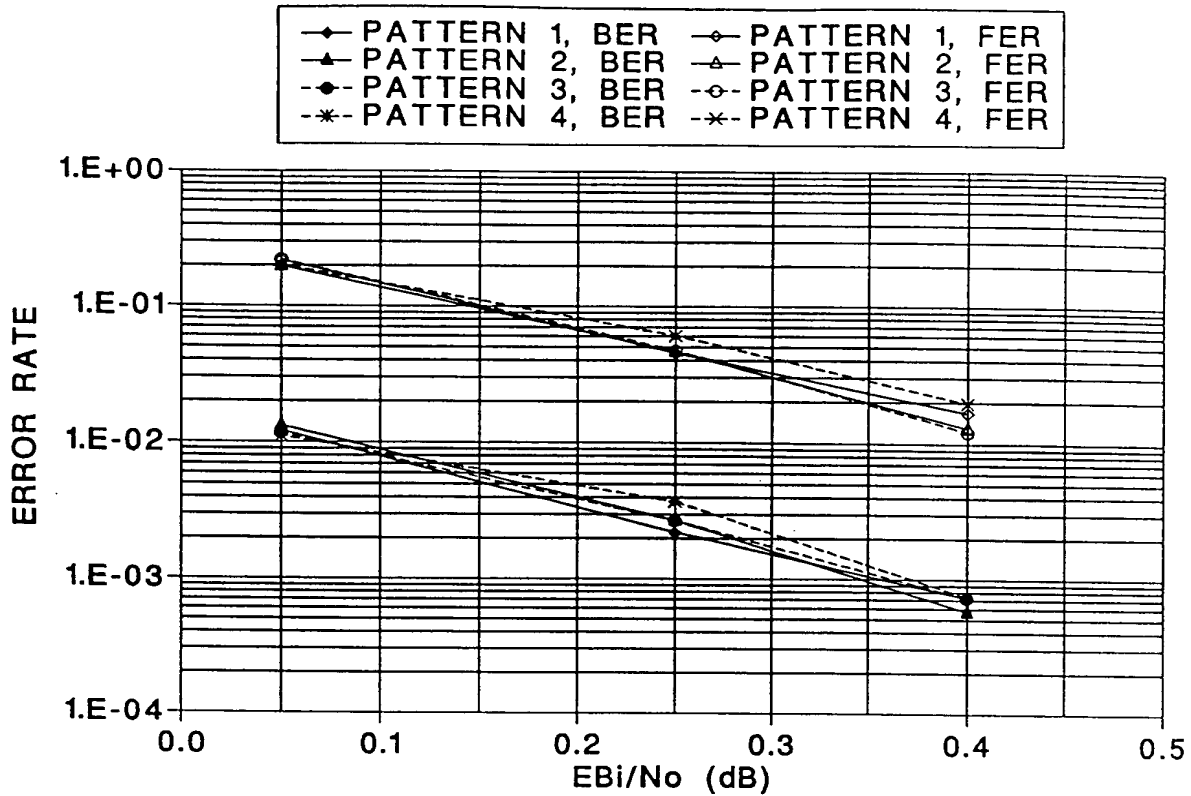


FIG. 13 BER/FER PERFORMANCE OF CODE #1, FRAME SIZE=1024

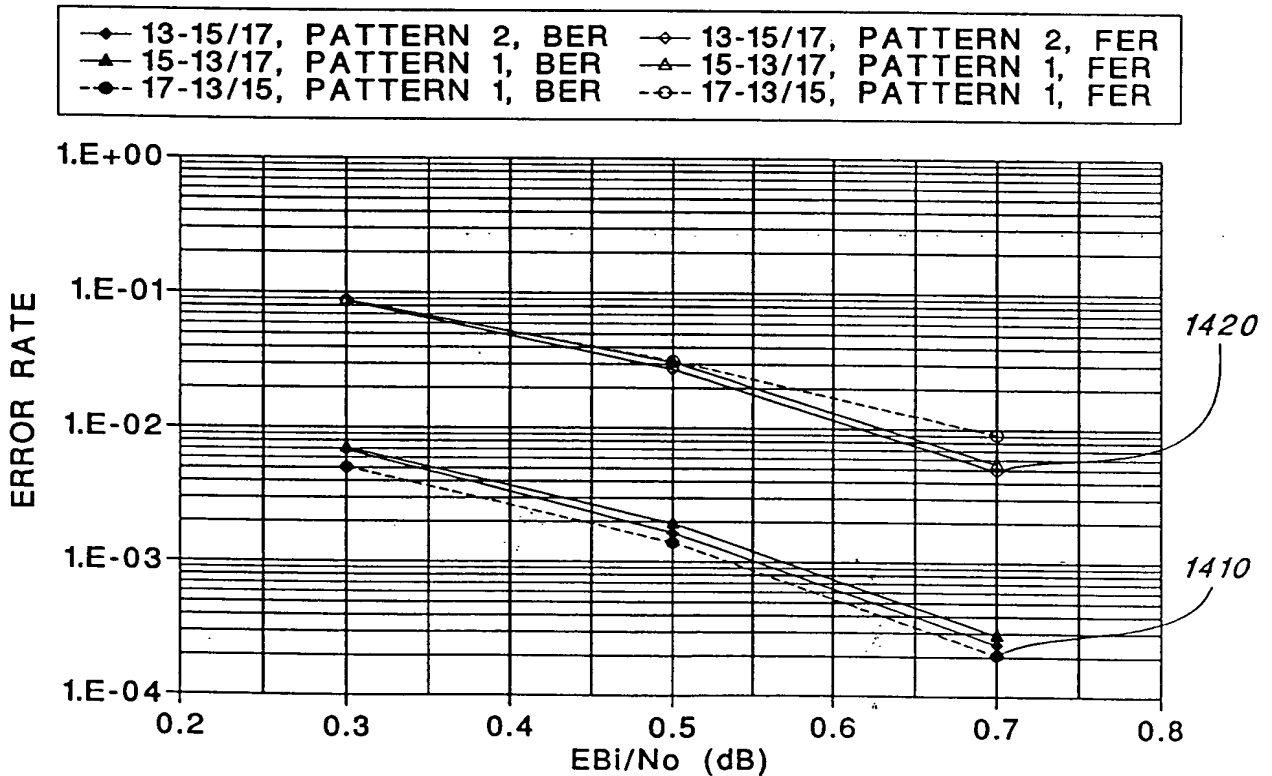


FIG. 14 BER/FER PERFORMANCE OF SELECTED RATE-1/4 TURBO CODES, FRAME SIZE=512

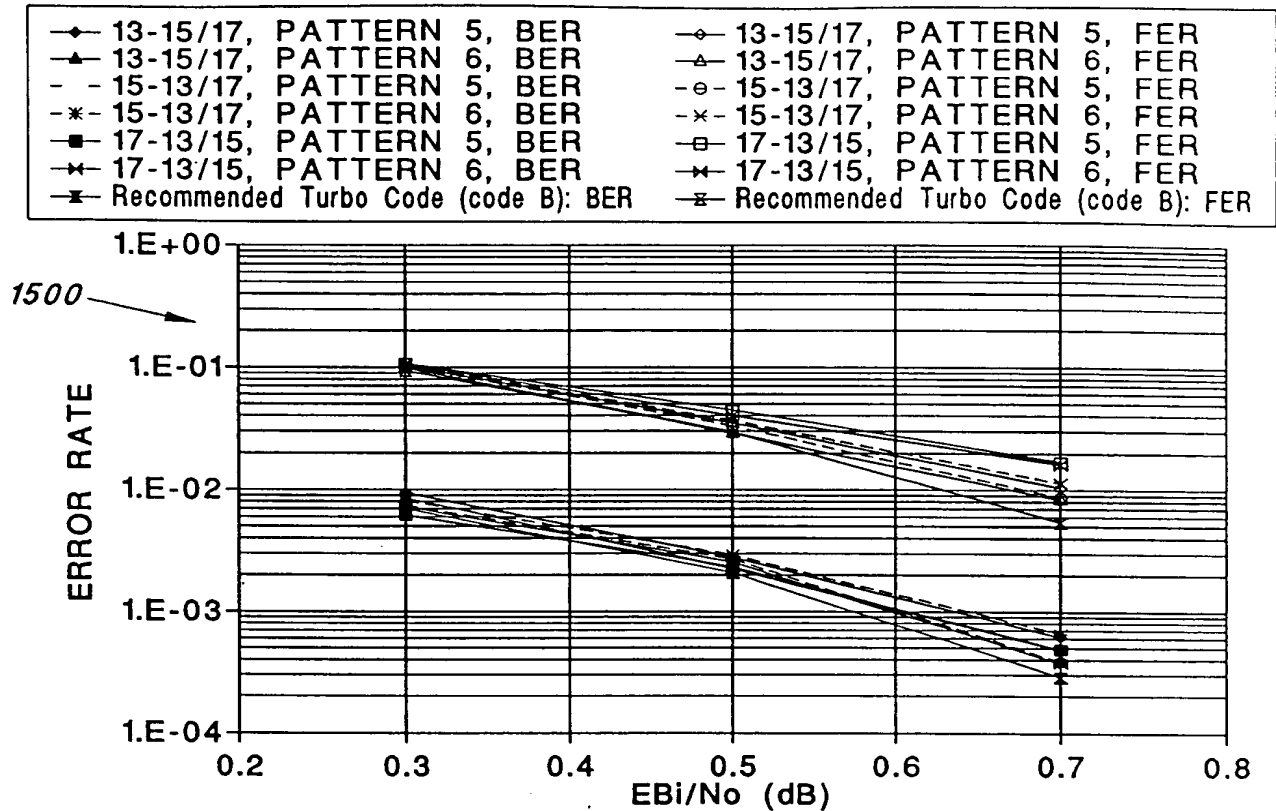


FIG. 15 COMPARISON AGAINST OTHER PUNCTURING SCHEMES, FRAME=512

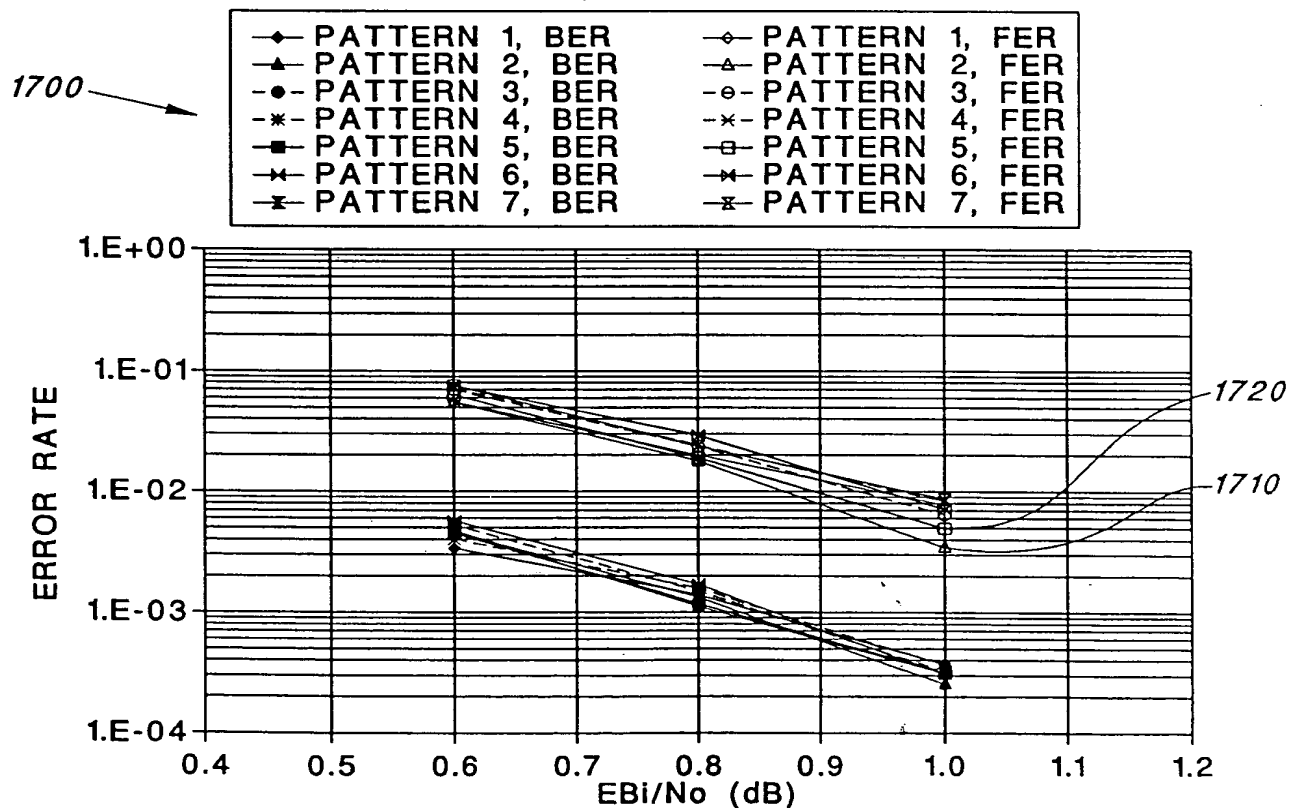


FIG. 17 COMPARISON OF RATE 1/3 PUNCTURING SCHEMES, FRAME=512

1600

<u>1602</u>	<u>1604</u>	<u>1606</u>	<u>1608</u>	<u>1610</u>	<u>1612</u>	<u>1614</u>
PATTERN 1	PATTERN 2	PATTERN 3	PATTERN 4	PATTERN 5	PATTERN 6	PATTERN 7
1111	1111	1111	1111	1111	1111	1111
1111	0000	1010	1110	1111	1110	0001
0000	1111	0101	0001	0000	0001	1110
0000	0000	0000	0000	0000	0000	0000
1111	0000	1010	0001	0000	1110	0001
0000	1111	0101	1111	1111	0001	1110

(a) TURBO CODE RATE = 1/3

<u>1640</u>	<u>1642</u>	<u>1644</u>	<u>1646</u>
PATTERN 1	PATTERN 2	PATTERN 3	PATTERN 4
1111	1111	1111	1111
1010	0000	1000	1010
0000	1010	0010	0000
0000	0000	0000	0000
0101	0000	0001	0000
0000	0101	0100	0101

(b) TURBO CODE RATE = 1/2

FIG. 16 ESSENTIAL PUNCTURING PATTERNS
FOR RATE 1/3 CONSTITUENT CODES

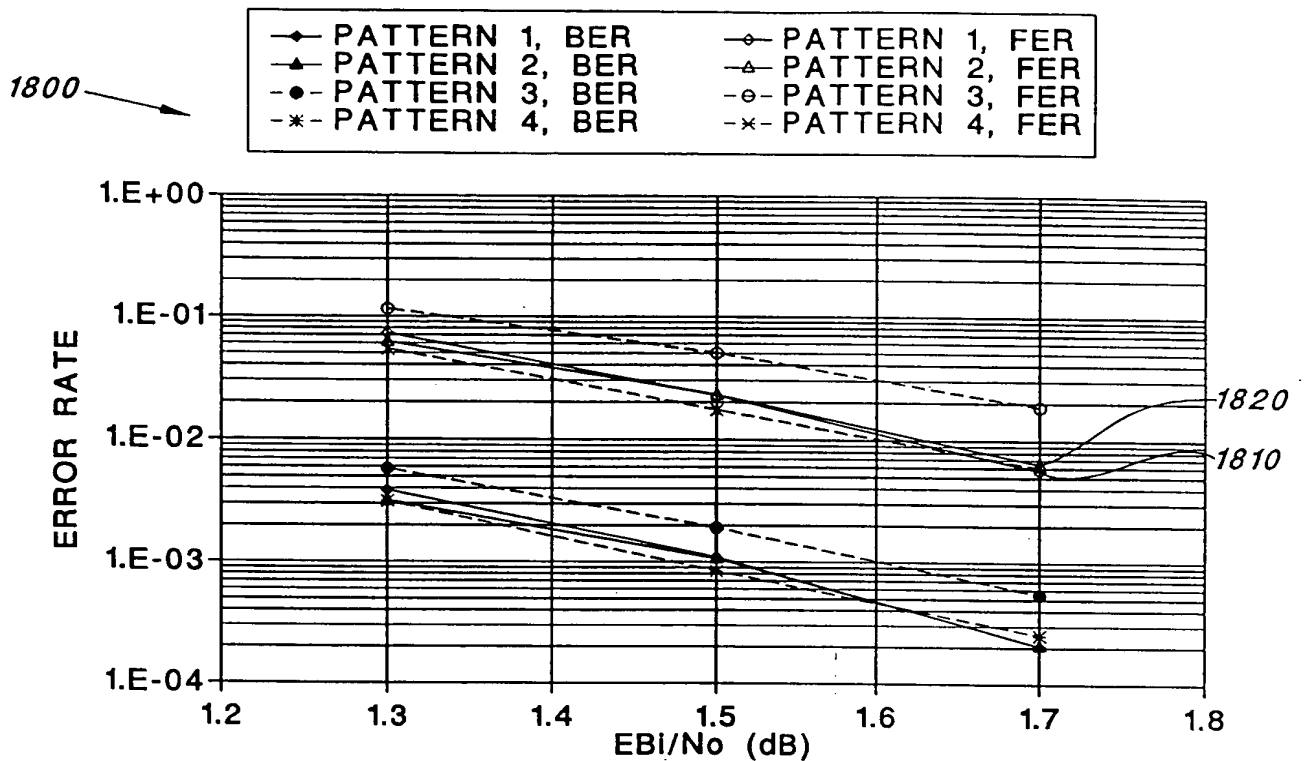


FIG. 18 RATE 1/2 PUNCTURING COMPARISON, FRAME=512

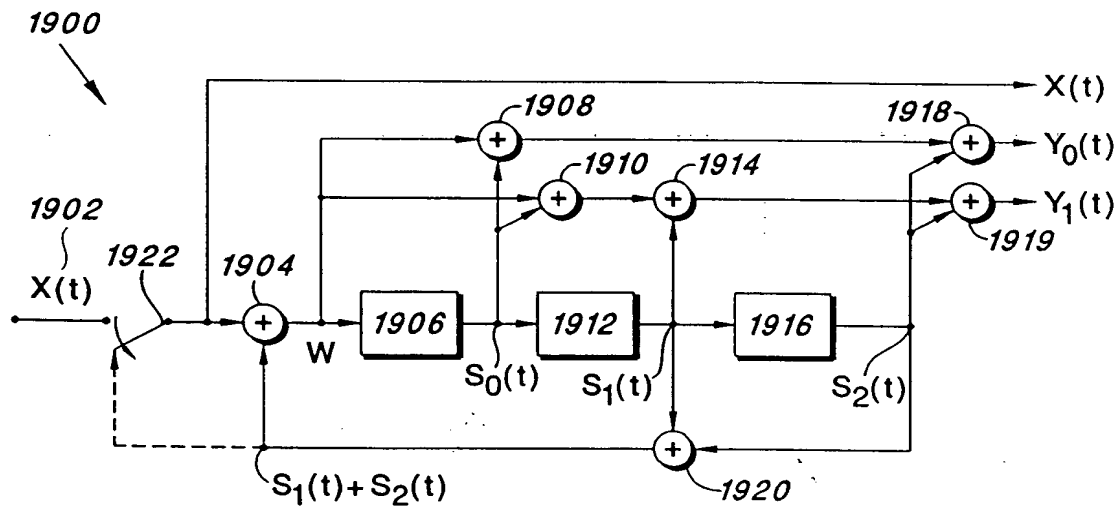


FIG. 19 UNIVERSAL CONSTITUENT ENCODER
RECOMMENDED FOR FORWARD LINK TURBO
CODES OF VARYING INTERLEAVER DEPTH

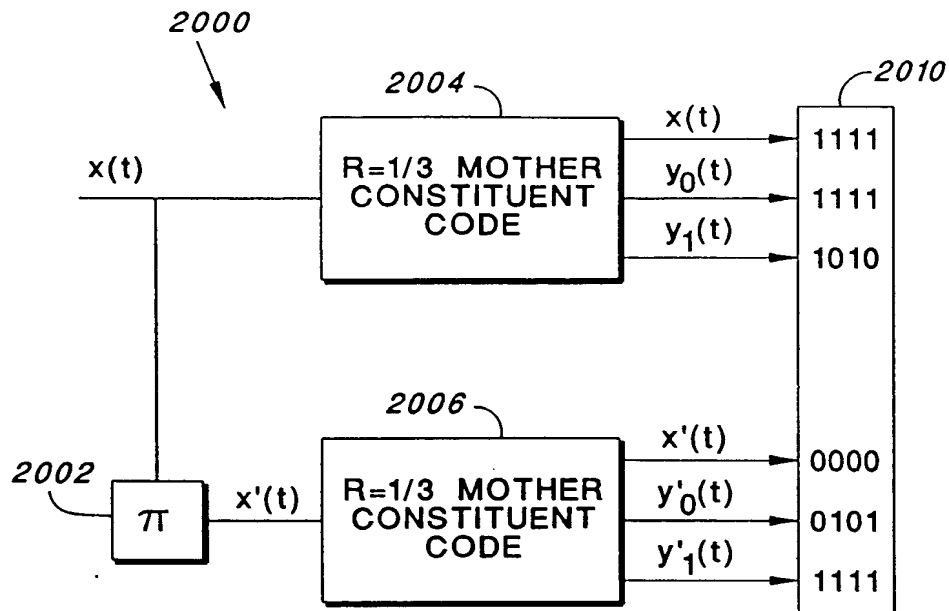


FIG. 20 FORWARD LINK TURBO CODE OF RATE 1/4 (MOTHER CODE IN FIGURE 19)

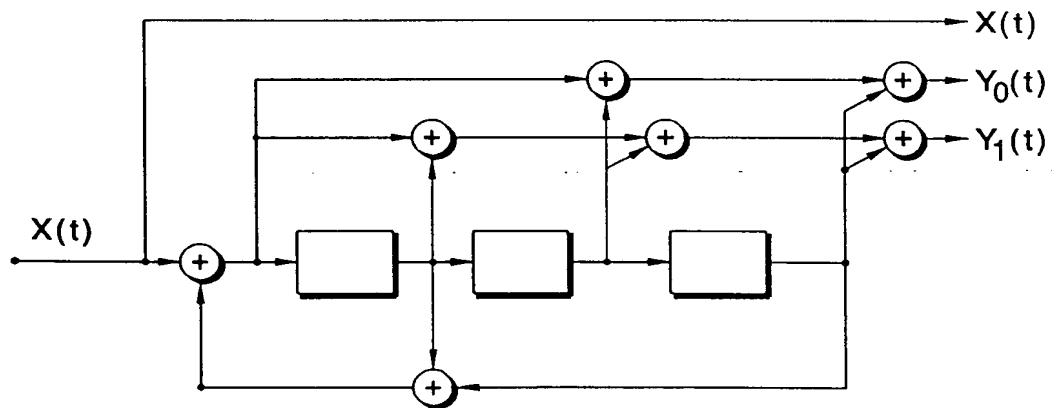


FIG. 25 CONSTITUENT ENCODER FOR REVERSE-LINK TURBO CODE

PATTERN 1	PATTERN 2
111	111111
111	111110
000	000000
000	000000
110	110111
000	000000

PUNCTURING PATTERNS
FOR RATE 3/8 FORWARD
LINK CODES

FIG. 21

PATTERN 1	PATTERN 2
1111	11111111
1101	11011010
0000	00000000
0000	00000000
1010	10101101
0000	00000000

PUNCTURING PATTERNS
FOR RATE 4/9 FORWARD
LINK CODES

FIG. 23

PATTERN 1	PATTERN 2	PATTERN 3
1111	1111	1111
1111	1011	1111
1011	1111	1011
0000	0000	0000
1111	1110	1110
1110	1111	1111

PUNCTURING PATTERNS FOR RATE 2/9 REVERSE LINK CODES

FIG. 27

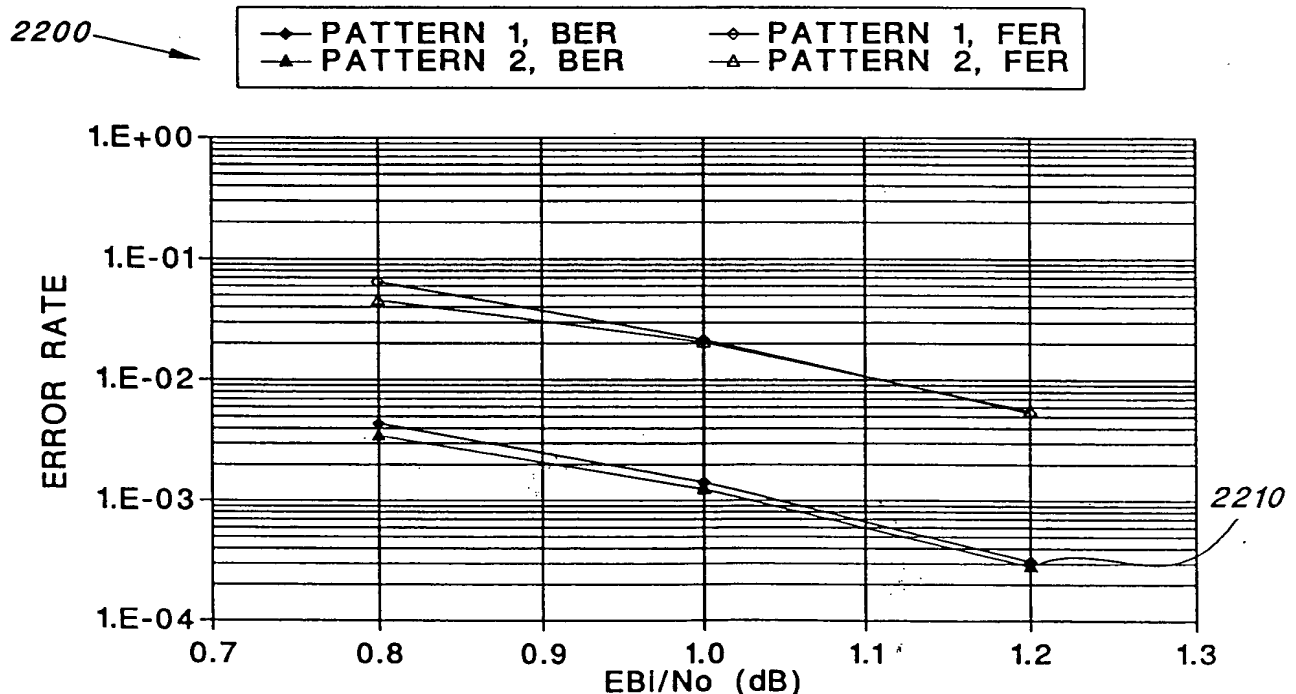


FIG. 22 RATE 3/8 FORWARD LINK TURBO CODES,
FRAME=512, AWGN CHANNEL

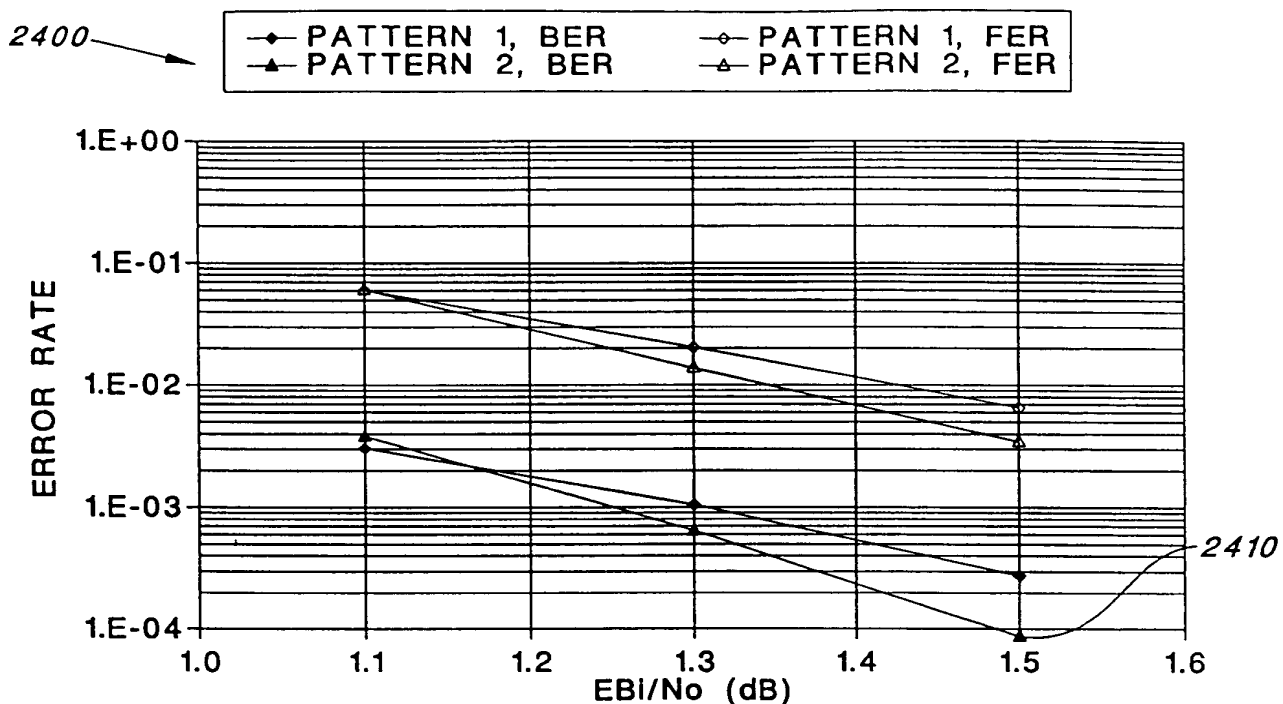


FIG. 24 RATE 4/9 FORWARD LINK TURBO CODES, FRAME=512, AWGN CHANNEL

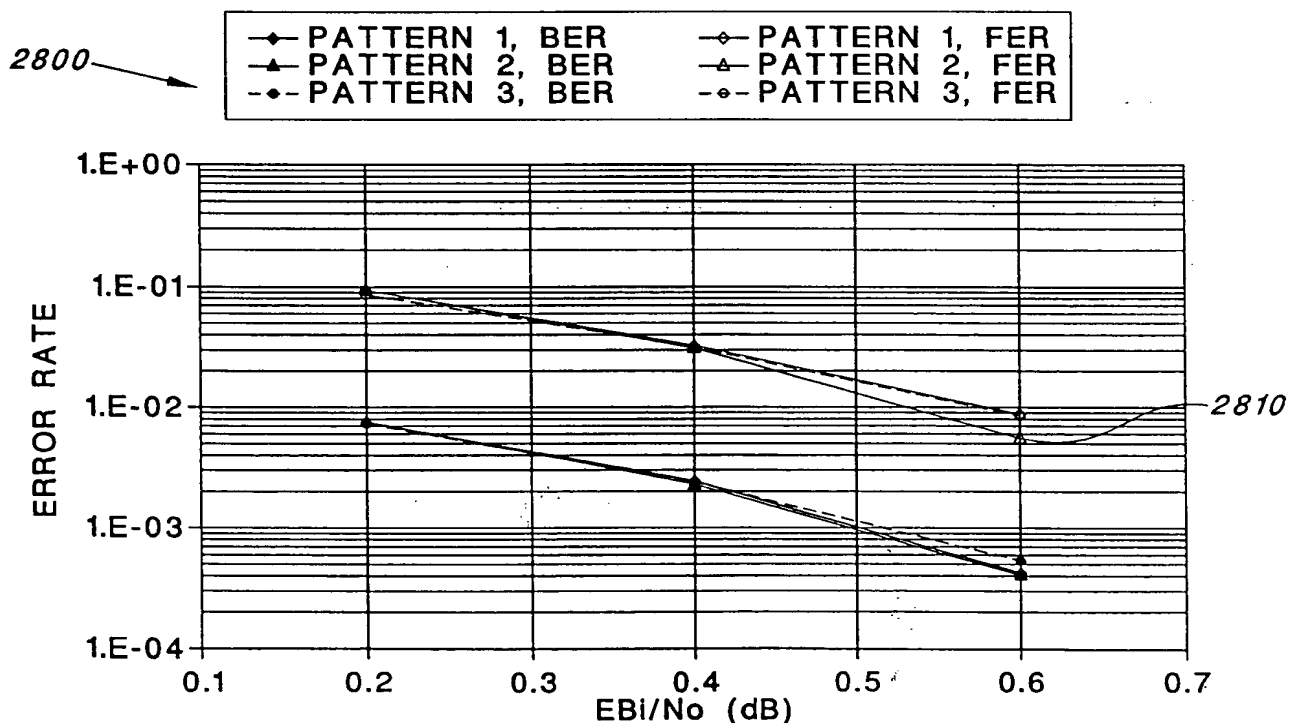


FIG. 28 RATE 2/9 REVERSE LINK TURBO CODES, FRAME=512, AWGN CHANNEL

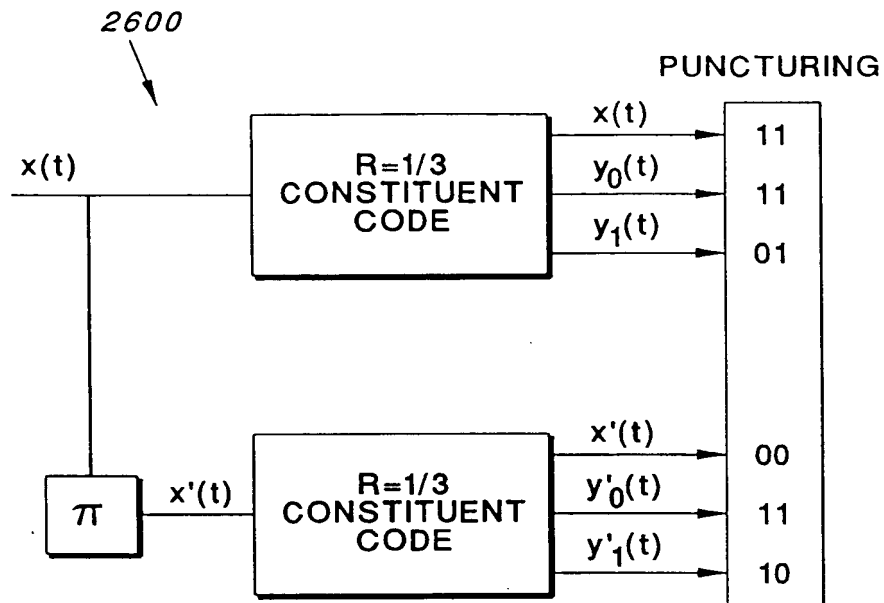


FIG. 26 REVERSE LINK TURBO CODE OF RATE 1/4
(MOTHER CODE IN FIGURE 25)

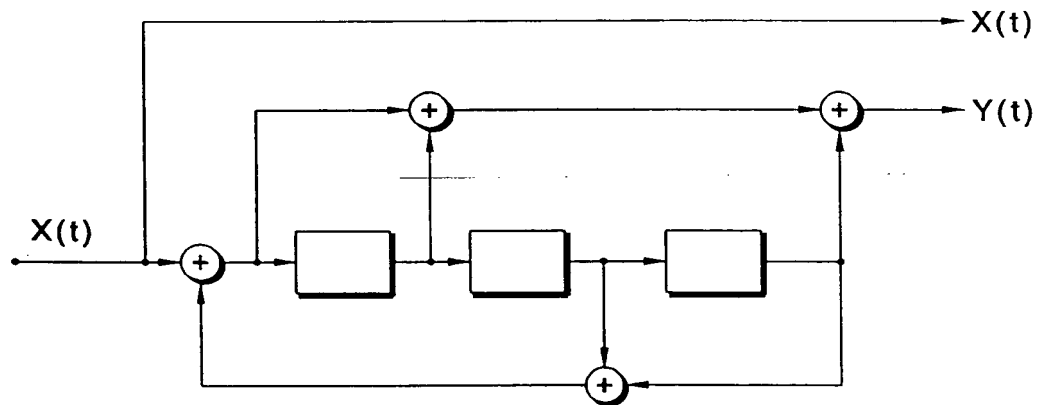


FIG. 31 UNIVERSAL CONSTITUENT ENCODER
RECOMMENDED FOR $R=1/2$ AND $R=1/3$ TURBO
CODES OF VARYING INTERLEAVER DEPTH

16/17		
PATTERN 1	PATTERN 2	PATTERN 3
111	111	111
111	110	110
000	001	001
000	000	000
110	110	010
000	000	100
PATTERN 4	PATTERN 5	PATTERN 6
111	111	111
100	100	000
011	011	111
000	000	000
010	000	000
100	110	110

INITIAL PUNCTURING PATTERNS
FOR RATE 3/8 REVERSE LINK CODES

FIG. 29

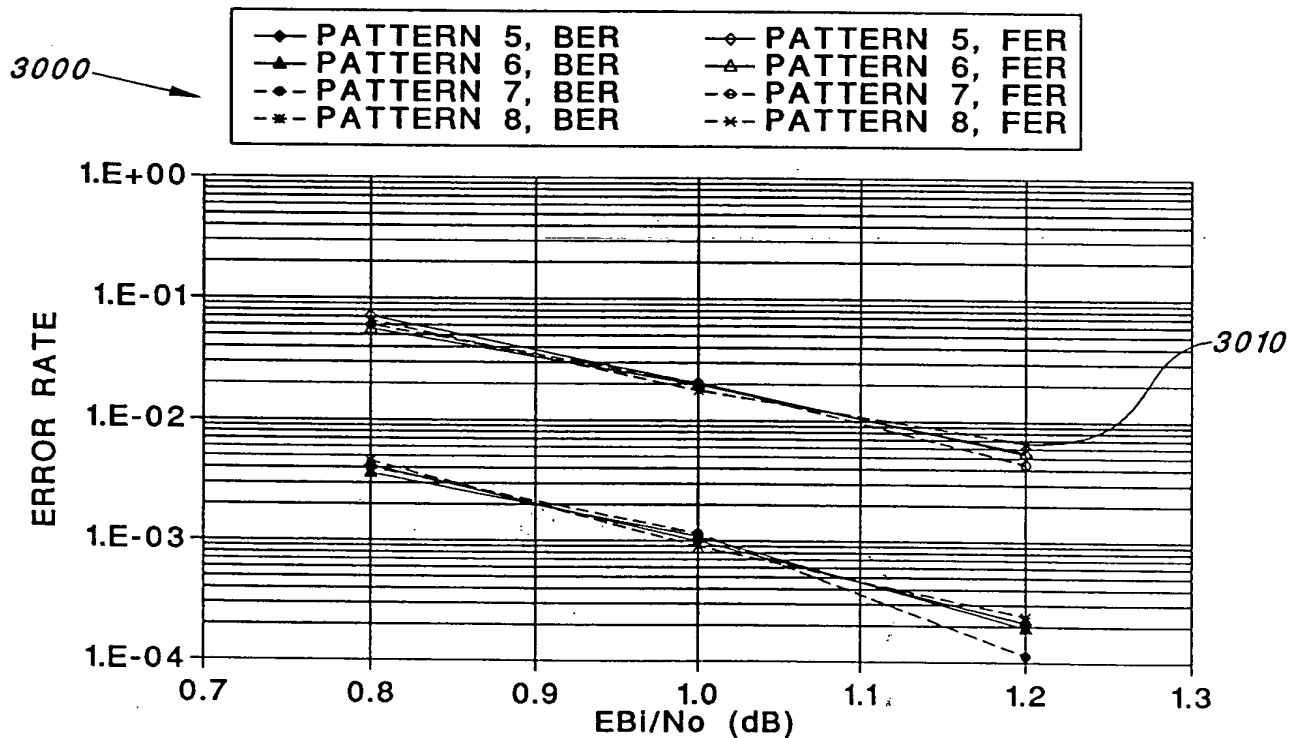
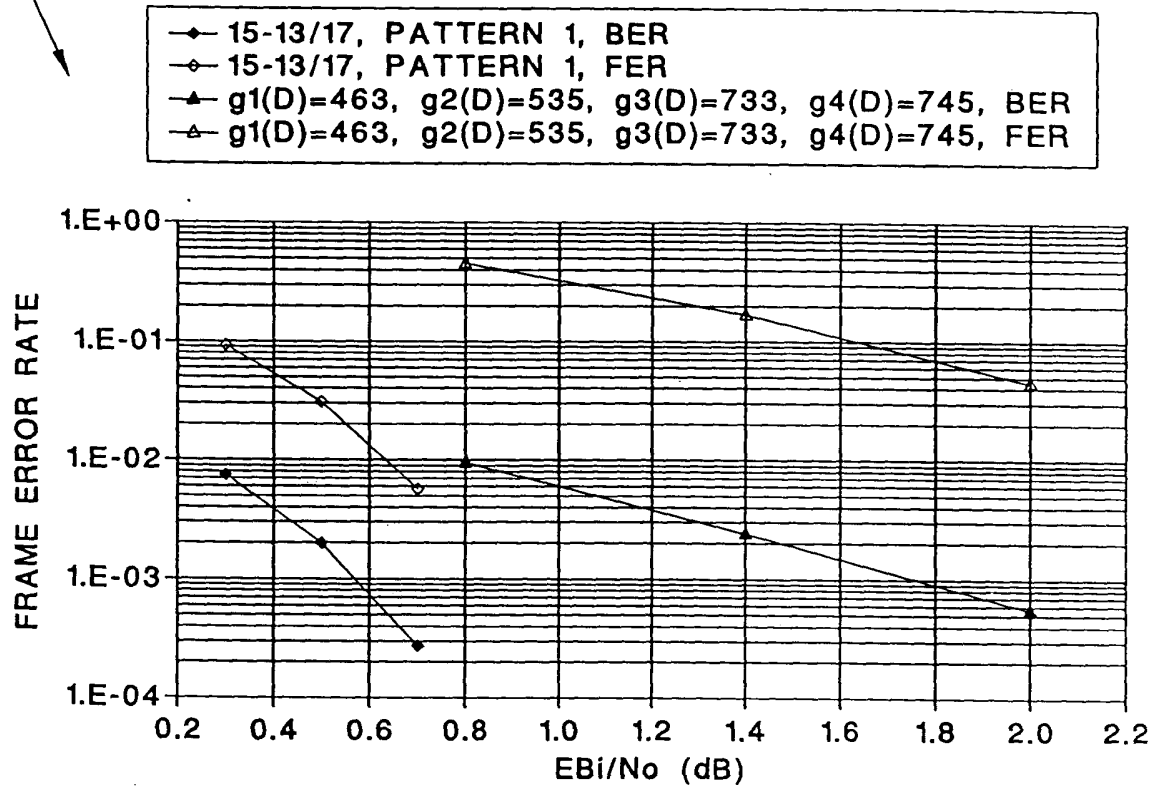


FIG. 30 RATE 3/8 REVERSE LINK TURBO CODES,
FRAME=512, AWGN CHANNEL

3200

**FIG. 32**

COMPARISON OF RATE 1/4 FER-OPTIMIZED
TURBO CODE VS CONVOLUTIONAL CODE,
FRAME SIZE=512